Feb. 21, 1939. B. E. M. MILLER 2,147,748

SIGN, ORNAMENTAL DEVICE, AND THE LIKE

Filed Aug. 22, 1935

FIG. 1

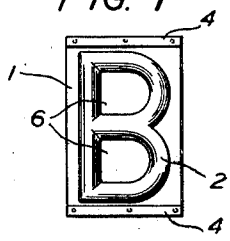


FIG. 2

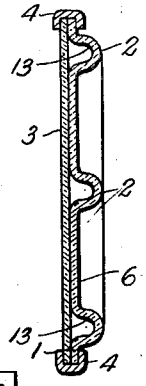


FIG. 3

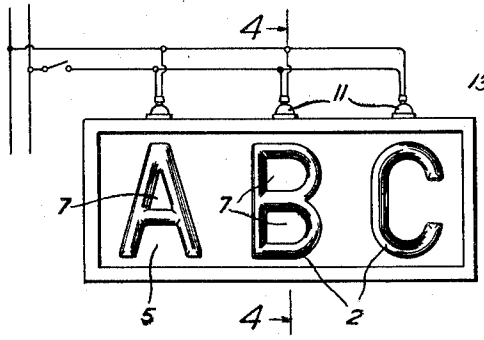
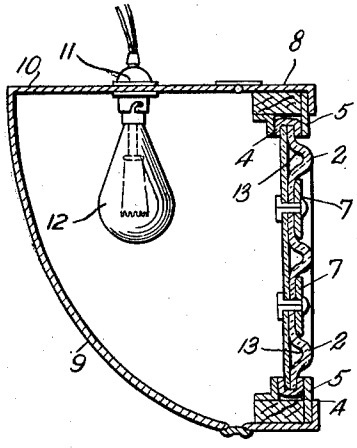


FIG. 4



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UNITED STATES PATENT OFFICE

2,147,748

SIGN, ORNAMENTAL DEVICE, AND THE LIKE

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In Great Britain September 7, 1934

15 Claims. (Cl. 40—133)

This invention relates to signs, ornamental devices, and like devices (hereinafter referred to as "signs"), for advertising, ornamental and other purposes.

According to the present invention such a sign comprises a base of light-transmitting material carrying a film of reflecting material said film being disposed so as to display the desired inscription or ornamental or other matter, and being of such thickness as to have good reflecting power, coupled with an ability to transmit a considerable proportion of any incident light. For example, a sign may comprise a sheet of transparent material, for instance, of a cellulose acetate plastic, carrying a thin film of gold, silver or other highly reflecting metal, the sheet being disposed behind, and in contact with, an opaque stencil sheet in which is cut the required inscription. Viewed by reflected light the inscription appears in gold or other metal on a dark background. On the other hand, when viewed by transmitted light the sign exhibits a bright inscription on a dark ground, the colour depending upon the colour of the illuminating light. In the case of a film of silver, for instance, very good results may be obtained when the illuminating light is of a red colour, such as that given by a neon lamp. With gold films yellow or green illuminating light is very satisfactory.

By forming the inscription in relief on the transparent sheet, for example by embossing, and permitting the raised portions to project through the above-mentioned opaque stencil sheet, a sign of very greatly enhanced appearance and utility may be obtained. The characters of the inscription then have the appearance of being formed of a substantial mass of metal and yet are sufficiently transparent to light to permit them to be satisfactorily illuminated from the rear.

Referring to the drawing, Figure 1 shows in elevation a device in accordance with the invention, and bearing a single character. Figure 2 shows a vertical section of the same. It comprises a sheet of light-transmitting cellulose acetate plastic or other material 1 having portions 2 raised in relief by embossing so as to form the desired character and carrying on the rear side a reflecting metal film 13 of such thickness as to be capable of transmitting a substantial proportion of incident light. The embossed sheet 1 is provided with a backing 3 of translucent matt sheet material, preferably colored, fixed thereto by metal clips 4.

Figure 3 shows in elevation and Figure 4 in vertical section through the line 4—4, a sign comprising an assembly of characters of the type illustrated in Figures 1 and 2. The characters are mounted behind an opaque stencil plate 5 with the embossed portions 2 projecting therethrough. Portions of the stencil such as those indicated at 7, which of necessity must be separate from the main portion of the sheet 5, may be fixed to the corresponding parts 6 of the sheet 1, for example by means of rivets. If desired portions of the stencil such as those indicated at 7 may be dispensed with and the parts 6 of the sheet 1 merely given a coat of opaque varnish or the like.

The stencil sheet 5 forms the front of a substantially light-tight box having a back 9 and a top 10 in which are fixed lampholders 11 carrying electric lamps 12. The hinged portion 8 facilitates access to the interior of the box.

Instead of using the separate opaque stencil sheet 5 to form the desired opaque ground, the latter may be secured by applying a coating of an opaque varnish, paint or the like. Again the ground may not be opaque; for instance it may be semi-transparent and/or coloured.

The reflecting coating 13 is preferably of gold, silver, or other metal of high reflecting power. It is further particularly advantageous to employ metals such as do not tarnish readily upon exposure to the atmosphere. As indicated above, it is necessary that the reflecting film 13 should be so thin as to transmit a considerable proportion of light incident thereon. A most satisfactory method of forming such films is to utilize the fine spray or stream of particles of metal which can be produced by applying, in a high vacuum, a high electric potential between electrodes of the metal to form the coating. By placing the article to be coated between such electrodes, the article may be given coatings of metal which are highly satisfactory for the purpose in view. For example, such coatings may be of great uniformity and firmly adherent to light-transmitting materials which it is convenient to employ in the construction of the signs and other devices of the invention. In this manner very satisfactory gold or silver films may be obtained at comparatively small cost.

The reflecting film 13 may be deposited either on the back of the light-transmitting material 1 or upon the front of the same, that is, upon the side from which the sign or the like is intended to be viewed. The latter method in general affords the most brilliant appearance, but on the other hand deposition of the film upon the back of the material has the advantage that the film can be much more effectively pro-

tected from mechanical damage or from the action of the atmosphere to which the sign may be subjected. The reflecting film 13 may very advantageously be given a coating of a protective varnish, e. g. a clear nitro cellulose.

Various materials may be employed as the light-transmitting base 1 upon which the reflecting film 13 is carried and on which the desired characters or other matter 2 are formed in relief. From the practical point of view it is highly advantageous to utilise light-transmitting thermoplastic materials as these materials are very easily embossed or otherwise worked. Particular mention may be made of cellulose acetate or other cellulose ester or ether plastics. Cellulose acetate plastics are particularly useful, more especially in view of their non-inflammable properties. Other thermoplastic materials may, however, be used, for example, light-transmitting synthetic resins, e. g. light-transmitting polymerised vinyl compounds or the light-transmitting condensation products obtainable from urea or thiourea and formaldehyde. The desired characters may, for instance, be formed in relief by embossing a sheet of the cellulose acetate plastic sold under the registered trade-mark "Celastoid". This material lends itself particularly well to such an operation. Any other desired methods of forming the requisite characters in relief may, however, be employed.

A transparent base material is generally to be preferred. If a semi-transparent material is employed the reflecting film 13 should be on the front surface if the most brilliant effects are desired.

The base material 1 may be coloured if desired. The colour preferably should not be of any great depth, at least when the reflecting film is on the rear of the base material. In the latter case it is possible, by tinting the base material to modify the appearance of the film when viewed from the front by reflected light.

It has been found that most satisfactory results are obtained when the reflecting film 13 of silver, gold, or other metal is formed upon a highly polished surface. Sheets of cellulose acetate plastic, as commercially available, do not in general have a polish sufficiently high for the purpose. To this end it is very advantageous to subject the material to a polishing operation, preferably after any embossing or other shaping operation which may be necessary. This polishing should be such as to eliminate the knife lines exhibited by commercial cellulose acetate sheet material when the latter has been prepared by cutting from a block in the customary manner. A polished finish may, for example, be given to cellulose ester or other materials by a short treatment with suitable solvents therefor.

For viewing the signs by transmitted light various sources of illumination may be employed, coloured light being usually more effective than white light. The colour of the light may be inherent in the source, as in the case, for instance, of a neon lamp, a mercury vapour lamp or some other forms of gas or vapour discharge lamp. If desired, however, other forms of illumination may be employed; for example, white light, e. g. from incandescent electric lamps 12, may be passed through suitable screens or filters as 3 in Fig. 2 in order to yield illuminating light of the desired colour. Where the reflecting film is carried on the rear side of the light-transmitting support 1 and is protected by a coating of varnish as described above, such coating of varnish may be coloured, thus avoiding the necessity for any further coloured screen or filter. Again if the reflecting film is on the front, the light-transmitting support 1 may be of coloured materials and serve as a light filter.

In order to secure even illumination of the sign it is frequently advantageous to interpose a semi-transparent screen between the source of light and the light-transmitting material carrying the reflecting film. There may be employed, for instance, a sheet of ground glass or a sheet of cellulose acetate plastic which has been rendered matt by sandblasting or otherwise. Preferably the light-diffusing screen should be placed at a short distance behind the light-transmitting material carrying the reflecting film. In the case where the characters of the sign are raised in relief upon a sheet of light-transmitting material, the light-diffusing screen may conveniently be attached directly to, and in close contact with, the light-transmitting sheet 1, as at 3 in Fig. 2.

If desired the light-diffusing screen may be itself coloured and the necessity for separate light-filtering means avoided.

Signs and the like in accordance with the invention, may be constructed in various ways. Thus, a sign may conveniently be constructed by embossing the desired characters 2 in a sheet of thermoplastic material 1 and then applying a thin coating of gold or silver 13 to the back thereof by the method referred to above. A matt sheet of cellulose acetate plastic 3 is attached to the back of the embossed and gold- or silver-coated material 1, for example, by means of meal clips 4 disposed along the edges. The matt sheet 3 may be coloured according to the nature of the source of light to be used and the appearance desired when the sign is illuminated from the back. Such an article forms an inexpensive yet very effective sign when mounted behind a suitable opaque stencil 5 with the embossed characters 2 projecting through corresponding apertures cut in the stencil.

In the case of a small sign it may conveniently be made from a single piece of light-transmitting material, the characters being embossed therein. In the case of such a unitary sign, the ground may be rendered opaque or of a low degree of translucency by a stencil or coating either on the front or on the back. By the latter construction a sign may be prepared which appears to be formed of solid metal having characters in relief when viewed by reflected light but shows a bright inscription on a dark ground when viewed by transmitted light. For larger signs it is more convenient to emboss comparatively small pieces of material with single characters, each piece bearing a character being provided if desired with its own matt and/or coloured backing in the manner and for the purpose indicated above. A number of such characters may then be assembled to form the desired sign, preferably by mounting in a suitable stencil with the embossed portions projecting through the apertures of the stencil.

The invention specifically includes such single characters whether provided with a matt or coloured backing or not and in association or not with a suitable stencil.

The light-transmitting material 1 bearing the reflecting film 13, together with the associated stencil 5 if such is employed, is conveniently

mounted in one side of a light-tight box-like structure adapted to contain the desired illuminating means. Such a construction enables the rear illumination to be reduced to a minimum at will, a most desirable feature when the device is being viewed by reflected light.

The signs or the like may be used in conjunction with a front and a rear illuminating means, one or both of which are operated intermittently. For instance the front and rear of the reflecting film 13 may be illuminated alternately, thus causing a periodic change in the appearance of the sign. A similar effect may be obtained by illuminating one side continuously and the other side intermittently if the intensities of the illumination on the two sides are suitably proportioned.

What I claim and desire to secure by Letters Patent is:—

1. A sign comprising a base of transparent material having the desired matter formed thereon in relief, the portions in relief bearing a regularly reflecting film of such thickness as to be capable of transmitting a substantial proportion of incident light.

2. A sign comprising a base of transparent material having the desired matter formed thereon in relief, the portions in relief bearing a regularly reflecting film substantially conforming in shape to the front surface of said portions in relief and of such thickness as to be capable of transmitting a substantial proportion of incident light.

3. A sign, comprising a base of transparent sheet material having the desired matter formed thereon in relief, said portions in relief bearing a reflecting metal film substantially conforming in shape with the front surface of the portions in relief and of such thickness as to be capable of transmitting a substantial proportion of incident light.

4. A sign, having the desired matter displayed by visible portions of substantially non-reflecting opaque surface and visible portions of transparent material standing in relief from the opaque surface, said transparent material bearing a reflecting metal film substantially conforming in shape with the front surface of the portions in relief and of such thickness as to be capable of transmitting a substantial proportion of incident light.

5. A sign, comprising a base of transparent sheet material having the desired matter formed thereon in relief, said portions in relief bearing on the rear a reflecting metal film of such thickness as to be capable of transmitting a substantial proportion of incident light, and means for illuminating the translucent sheet from the rear.

6. A sign, comprising transparent sheet material having the desired matter formed thereon in relief, said portions in relief bearing on the rear a reflecting metal film of such thickness as to be capable of transmitting a substantial proportion of incident light, and a sheet of coloured light-transmitting material attached to the back of said sheet bearing matter in relief.

7. A sign, comprising transparent sheet material having the desired matter formed thereon in relief, said portions in relief bearing on the rear a reflecting metal film of such thickness as to be capable of transmitting a substantial proportion of incident light, and a sheet of translucent light diffusing material attached to the back of said sheet bearing matter in relief.

8. A sign, comprising transparent sheet material having the desired matter formed thereon in relief, said portions in relief bearing on the rear a reflecting metal film of such thickness as to be capable of transmitting a substantial proportion of incident light, and a sheet of coloured translucent light diffusing material attached to the back of said sheet bearing matter in relief.

9. A sign, comprising transparent sheet material having the desired matter formed thereon in relief, said portions in relief bearing on the rear a reflecting silver film of such thickness as to be capable of transmitting a substantial proportion of incident light, and a sheet of red translucent light diffusing material attached to the back of said sheet bearing matter in relief.

10. A sign, comprising transparent sheet material having the desired matter formed thereon in relief, said portion in relief bearing on the rear a reflecting metal film of such thickness as to be capable of transmitting a substantial proportion of incident light, a substantially non-reflecting opaque covering over the portions not in relief, and means for illuminating from the rear the portion in relief.

11. A sign according to claim 10, wherein the non-reflecting opaque covering forms part of a substantially light tight box containing the illuminating means.

12. A sign, comprising transparent sheet material having the desired matter formed thereon in relief, said portion in relief bearing on the rear a reflecting silver film of such thickness as to be capable of transmitting a substantial proportion of incident light, a substantially non-reflecting opaque covering over the portions not in relief, and means for illuminating from the rear with red light the portions in relief.

13. An element adapted to form part of a sign, comprising a sheet of transparent material having a single character raised thereon in relief, said portions in relief bearing on the rear a reflecting metal film of such thickness as to be capable of transmitting a substantial proportion of incident light, and a sheet of coloured light-transmitting material attached to the back of said sheet.

14. An element adapted to form part of a sign, comprising a sheet of transparent material having a single character raised thereon in relief, said portions in relief bearing on the rear a reflecting metal film of such thickness as to be capable of transmitting a substantial proportion of incident light, and a sheet of coloured translucent light diffusing material attached to the back of said sheet.

15. An element adapted to form part of a sign, comprising a sheet of transparent material having a single character raised thereon in relief, said portions in relief bearing on the rear a reflecting silver film of such thickness as to be capable of transmitting a substantial proportion of incident light, and a sheet of red translucent light diffusing material attached to the back of said sheet.

BRIAN EDWARD MERRIMAN MILLER.